

CLAIMS

1. A combustion exhaust gas treatment process which comprises adding ammonia to denitrated combustion exhaust gas to convert SO_3 and/or sulfuric acid mist to ammonium sulfate and/or ammonium hydrogen sulfate, removing the produced ammonium sulfate and/or ammonium hydrogen sulfate with dust, desulfurizing the resulting gas using an aqueous solution containing calcium carbonate and filtering the ~~solution~~ to separate calcium sulfate ~~and~~ filtrate, and then adjusting the pH of the filtrate to 9-12 while simultaneously adding carbon dioxide and/or an aqueous carbonic acid solution, or else adjusting the pH to 9-12 after adding carbon dioxide and/or an aqueous carbonic acid solution, adding a flocculating agent ^{to the pH adjusted filtrate to precipitate and separate a solid} to precipitate and separate a solid portion to form a supernatant, conducting the supernatant to a ~~separately provided~~ ammonia recovery step at which ammonia is recovered by introducing steam for distillation and concentration, and thereafter adding the recovered ammonia to the aforementioned denitrated gas.

2. The process of claim 1, wherein the combustion exhaust gas is combustion exhaust gas from a boiler.

3. The process of claim 1 or 2, wherein the removed ammonium sulfate and/or ammonium hydrogen sulfate together with the dust is mixed with water and heavy oil, the mixture is separated into the solid portion containing the dust and heavy oil and the aqueous solution containing ammonium sulfate and/or ammonium hydrogen sulfate, the pH of the aqueous solution is adjusted to 9-12, and then a coagulant is added, the solid portion is precipitated and separated and the supernatant is conducted to the ammonia recovery step.

4. The process of claim 1 or 2, wherein the Ca concentration of the supernatant conducted to the ammonia recovery step is no greater than 5 ppm.

5. The process of any one of claims 1 to 4, wherein the ammonia concentration in the waste water

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which has been conducted to the ammonia recovery step and has had ammonia recovered is no greater than 40 ppm.

6. A combustion exhaust gas treatment apparatus comprising at least an electric dust collector for removal of dust, a desulfurization apparatus employing calcium carbonate and a waste water treatment apparatus for treatment of the desulfurized waste water discharged from the desulfurization apparatus, the combustion exhaust gas treatment apparatus being constructed in such a manner that ammonia recovered from the desulfurized waste water using a waste water treatment apparatus comprising the following apparatuses (1) to (4) returns to the upstream end of the electric dust collector.

(1) A filtering apparatus for filtration of calcium sulfate.

(2) A pH adjusting apparatus provided with a function of supplying carbon dioxide and/or an aqueous carbonic acid solution.

(3) A precipitation and separation apparatus which precipitates and separates the solid portion after addition of the flocculating agent.

(4) A concentration apparatus which introduces steam into the supernatant obtained by precipitation and separation of the solid portion, and recovers the ammonia.

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